

**Remarks**

**General:**

Claims 10-15 and 17-19 are pending in the application. Claims 10-15 and 17-19 are rejected, and are now canceled. Claims 20-33 are new.

No new matter is added by this amendment.

**35 USC § 102 and § 103:**

Previous claims 10, 12, 14, 15, 16 were rejected as anticipated by U.S. Patent No. 5,642,984 (Gorlov). Claims 10-12, 14, 15, 17, 19 were rejected as anticipated by U.S. Patent No. 5,440,175 (Mayo). Claim 13 was rejected as obvious over Mayo in view of official notice. Claim 18 was rejected as obvious over Mayo in view of U.S. Patent No. 973,869 (Logan). The rejections are traversed as to the claims now presented.

The present invention relates to a dam-effect waterwheel. As is shown by the historical materials in Senior et al. and Müller, the concept was recognized in the art before the Applicants' February 2003 filing date, and the person of ordinary skill in the art, reading Applicants' specification, would have recognized Applicants' disclosure as being directed to an improved dam-effect waterwheel. Senior et al. (page 2, lines 11-12) define a dam-effect waterwheel as one that "restrains the flow of water thus maintaining the upstream water level, without the use of a sluice gate." As the Examiner has pointed out, that definition is too weak, because almost any obstruction in flowing water will restrain the water flow, and maintain an elevated upstream water level, to some extent. As may be seen from FIG. 1 of Brinnich and FIGS. 2 and 3 of the present application, the true requirement is that the waterwheel shall act as a dam, maintaining a static head with only the inevitable leakage losses apart from the water actually drawn to drive the wheel.

Gorlov's device works in a completely different way. Gorlov's turbine is an open structure intended to be used in an unchanneled flow, in which a static head would not be possible. Even the distributor 206 shown in FIG. 17 is intended only to deflect a flow, not to

maintain a head. That is clear from the large space between the outside of the distributor and the inside of the rotor blades, and the total absence of any structure outside the blades.

Mayo's device works in a completely different way. Mayo's waterwheel is an overshot device, in which the upstream head is controlled by the crest of dam 44 and the lip of chute 60 acting as sluice gates. Mayo leaves a large space between the dam 44 and the wheel 6, because no water flows through that space.

Applicants' device, in contrast, is a dam-effect device, in which the space between the bottom of dam 4 and the top of inlet channel 15 is essentially closed by the blades 2.

New claim 20 (corresponding to previous claim 11) recites the essential characteristics of the device in generic terms. New claim 27 (corresponding to previous claim 19 rewritten in independent form), points out more specifically the structural features by which Applicants' embodiment achieves the required characteristics. Support for the features recited in claim 27 is found in the description as follows:

27. A device for capturing the potential energy of water, comprising:	
a hollow wheel rotatable about a horizontal axis and	See Fig. 1
comprising blades;	Blades 2
a fixed part located inside the rotatable wheel	Dam 4
and serving as a dam to retain a water level for capturing potential energy of the water and	Water level shown by horizontal lines on left of Fig. 1.
having a curved underside matching the hollow wheel; and	See Fig. 1.
a lower fixed part cooperating with the fixed part located inside the rotatable wheel to define an inlet channel for water and	Inlet channel 15
an outlet channel,	Outlet channel 16
the inlet channel having a curved upper surface facing the curved underside of the fixed part serving as a dam,	See Fig. 1
the inlet channel cooperating with the fixed part serving as a dam and with the blades in the channel so as to enable energy of the water to	See Figs. 1 and 2.

be captured, and	
so that with the blades in between the inlet channel and the fixed part serving as a dam the only losses at the lower part of the rotatable wheel are leakage losses.	Page 2, lines 1-4.

New claims 20 and 27 are distinguished over Brinnich because Brinnich shows only a wheel with a solid center acting as a dam. There is no suggestion in Brinnich, or in any of the other prior art references, of a fixed dam having the characteristics recited in Applicants' claims as now presented. Brinnich (see Fig. 1) uses the solid hub of his waterwheel as the dam, and shows the dammed head level at the top of the hub. However, as may be seen from Fig. 2 of Brinnich, a water level above the top of the hub will exert a back-pressure and drag on the returning blades. To prevent that, a separate waste-weir is required. Applicants' fixed dam 4, in contrast, allows the head level to be set below the top of the hub without a separate waste-weir, saving both space and expense. In addition, the use of a fixed dam enables the use of an open wheel, allowing air to be vented from the chambers between the blades as the blades enter the water (see the left side of Fig. 1) without requiring separate vents or ductwork. Contrast Brinnich, who has to provide special "Schwimmerklappen" (float valves) 3 to allow water into the blade chambers at the corresponding point.

In addition, because Brinnich uses a flat-bottomed inlet channel, the channel is completely closed only when a blade is positioned exactly central between the axis of the wheel and the bottom of the channel, which is an impossibility with Brinnich's preferred helical blades. In this respect also, Applicants' design is different from, and an improvement over, Brinnich. It is noted that some of the old drawings in Müller seem to show inlet channels with curved bottoms in the context of conventional undershot waterwheels. However, without access to the original documents to which Müller cites, it is not possible to know what those documents would actually have taught the skilled reader.

Thus, there is no disclosure or suggestion in any of the cited references of the present apparatus as now claimed, or of the advantages thereof, and the claims are believed to be not only novel but also non-obvious over the cited prior art.

**Conclusion:**

In view of the foregoing, claims 20-33 are deemed to be in order for allowance. Reconsideration and withdrawal of the examiner's objections and rejections and an early notice of allowance of all claims are earnestly solicited.

Respectfully submitted,

MICHEL FONFREDE *et al.*

BY: 

DANIEL A. MONACO  
Registration No. 30,480  
Drinker Biddle & Reath LLP  
One Logan Square  
18<sup>th</sup> and Cherry Streets  
Philadelphia, PA 19103-6996  
Tel: (215) 988-3312  
Fax: (215) 988-2757  
*Attorney for Applicants*